AGRICULTURAL IRRIGATION BEST MANAGEMENT PRACTICES FOR CONVERSIONS OF INTERRUPTIBLE WATER RIGHTS ON THE COLUMBIA RIVER

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Mainstem Columbia River water users are given an option of advancing water use and efficiency practices, known as "best management practices" (BMPs), as part of a new water management program.

Through participation in this efficiency program, existing mainstem water users with water rights that are presently subject to instream flow levels established in 1980, can convert their interruptible water rights into uninterruptible water rights.

The "best management practices" for water management and operation are described below. These practices cover diversion and distribution systems, application systems and technology, crop and water management, new research, development and demonstration projects, and benefits for fish, wildlife, and environmental resources.

Participation in the program is voluntary.

The efficiency program classifies existing water right holders into three sectors, with appropriate BMPs associated with each water user sector.

A. The sectors are:

i. Small Public Sector Irrigation. Public sector entities--municipalities, schools, public service districts, or state agencies--with less than 25 acres under irrigation, with water rights for a single contiguous site.

ii. Other Small Irrigation. Public sector entities (26-100 acres) or small privately owned irrigation (100 acres or less).

iii. Large Irrigation. Irrigators with more than 100 acres under irrigation.

B. Small Public Sector Irrigation:

i. Primary irrigation to occur during night irrigation schedules.

ii. Use of timed irrigation sets to apply irrigation water based on turf/crop consumptive demand, estimates updated monthly.

iii. Conveyance losses from the source diversion to the point of application shall not exceed 15% of the total diversion.

iv. On-site application efficiency shall not be less than 70%, under average operating conditions.

C. Other Small Irrigation.

i. Use of timed irrigation sets to apply irrigation water based on turf/crop consumptive demand, estimates updated monthly.

ii. Conveyance losses from the source diversion to the point of application shall not exceed 15% of the total diversion.

iii. On-site/farm application efficiencies shall not be less than the efficiencies shown in Table 1.

Table 1

Irrigation Technology	Direct Machine Efficiency*
Solid Set (above canopy)	65%
Solid Set (below canopy or row crop)	70%
Wheel-Line or Hand-Line (impact sprinkler)	65-70%
Traveling Gun-Single Nozzle	65%
Center Pivot (over-head impacts, >25 psi)	75%
Center Pivot (drop tube <25 psi)	85%
Micro-Sprinkler	85%
Drip-Precision Irrigation	90-95%

* Source: Technical Memorandum from Benton County Water Conservancy Board to WADOE ERO and CRO Water Resources Program Staff, Revised Table for Efficiency Factors for Use Under 90.03.380, Efficiency Estimates Minus Return Flows, Dated May 4, 2000, Kennewick, WA; and Sources and Citations Therein.

D. Large Irrigation:

i. Pumping plants shall use multi-speed drives or high efficiency motors for the specific system configuration, with annual computer monitoring to enhance energy and water use efficiency for larger systems; any noncompliance issues will be rectified within a reasonable compliance period.

ii. All main transmission/distribution systems are closed, pressurized systems, with conveyance losses less than 5%.; all systems incorporate friction reducing components or energy efficiency engineering; any noncompliance issues will be rectified within a reasonable compliance period, or the water right holder agrees to meeting full system compliance at next technology change or retrofit cycle.

iii. All conventional standards for crop water-use are met or exceeded (water use measured in annual inches of consumptive use and evapotranspiration, by crop and by micro-climate area), as established by the WSU crop water use requirements (1991 edition and technical appendices) and WSU Public Agricultural Weather Systems data.

iv. On-site/farm application efficiencies shall not be less than the efficiencies shown in Table 1. By 2015, the minimum on-farm application efficiency (farm average), in Table 1, shall be 75%.

v. By 2015, drip irrigation and precision irrigation systems shall be introduced where crop types and technology allow.

vi. Soil moisture sensors and probes (and/or other remote sensing technologies) shall be employed for monitoring water needs; these data shall be reviewed jointly with real-time weather forecast data to establish daily, and near-term, irrigation schedules; any noncompliance issues will be rectified within three years of operation under rule compliance.

vii. For tree fruit crops, cover crops (or other practices) shall be allowed to reduce water evaporation (from temperature cooling) and reduce soil erosion; any noncompliance issues will be rectified within a reasonable compliance period.

viii. Cultivation practices shall be used to enhance water infiltration and eliminate soil erosion.

ix. Water management shall be used to reduce chemical and fertilizer application rates per acre, and it is a component of integrated pest management regimes (where applicable and cost-effective) to improve the effectiveness of biological controls and reduce pest habitats.

x. Water Right holders are encouraged to introduce and experiment with variable rate irrigation practices--acre-to-acre systems--and new forms of precision application and emitter controls.

xi. Water Right holders are encouraged to introduce and experiment with computer monitoring of irrigation systems for both efficiency and performance measures.

xii. Water right holders are encouraged to introduce and experiment with underground drip application systems for broad commercial applications, for some crops.

xiii. Water right holders are encouraged to introduce, experiment with, and document the effectiveness of, new soil conditioning products ("soil soap" or "wet soil" products); commercial applicability will be determined based on project monitoring, performance and cost-effectiveness.

xiv. Water right holders are encouraged to develop wildlife habitat and refuge areas, where cost-effective.

xv. Water right holders are encouraged to develop synergistic projects related to irrigation water management and improvements to fish habitat and rearing grounds.

E. All of the water user sectors shall comply with fish screening and water measuring standards, as stated below:

i. Water diversion facilities are screened and approved by the Washington Dept. of Fish and Wildlife, pursuant to RCW 77.16.220, RCW 77.55.040, and RCW 77.50.070; existing screen configurations are consistent with mid-1990s standards; facilities are inspected and maintained annually; any noncompliance issues will be rectified within an approved compliance period.

ii. Source water diversions are metered as described in the rule "Requirements for Measuring and Reporting Water Use," Chapter 173-173 WAC. Water users shall report monthly water use totals and monthly peak diversions to the Dept. of Ecology using one of the available electronic reporting methods.